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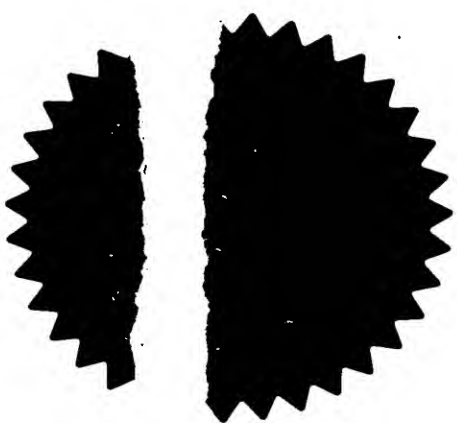
The Patent Office  
Concept House  
Cardiff Road  
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South Wales  
NP10 8QQ

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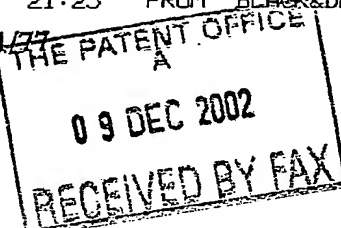
Dated

20 November 2003

Patents Form 1/77

Patents Act 1977

(16)



1/77

10DEC02 E769651-6 C68900

P01/7700 0.00-0228659.9

**Request for grant of a patent**

(See the notes on the back of this form. You can also get an explanatory leaflet from the Patent Office to help you fill in this form)

Cardiff Road  
Newport  
Gwent  
NP10 8QQ

1. Your reference

P-UK-PR1110

09 DEC 2002

2. Patent application number  
(The Patent Office will fill in this part)

0228659.9

3. Full name, address and postcode of the or of each applicant (underline all surnames)

Black & Decker Inc.  
Drummond Plaza Office Park  
1423 Kirkwood Highway  
Newark, Delaware  
USA

Patents ADP number (if you know it)

If the applicant is a corporate body, give the country/state of its incorporation

Delaware, USA

34214001

4. Title of the invention

PLANER

5. Name of your agent (if you have one)

Ian Stephen Bell

"Address for service" in the United Kingdom to which all correspondence should be sent (including the postcode)

Black & Decker  
Patent Department  
210 Bath Road  
Slough  
Berks SL1 3YD  
United Kingdom

Patents ADP number (if you know it)

8130148001

6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and (if you know it) the or each application number

Country

Priority application number  
(if you know it)Date of filing  
(day / month / year)

7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application

Number of earlier application

Date of filing  
(day / month / year)

8. Is a statement of inventorship and of right to grant of a patent required in support of this request? (Answer 'Yes' if:

Yes

- a) any applicant named in part 3 is not an inventor, or  
b) there is an inventor who is not named as an applicant, or  
c) any named applicant is a corporate body.  
See note (d))

## PLANER

The present invention relates to a planer and in particular to debris collection containers for a planer and airflow and chip removal in a planer.

Planers comprise a body mounted on a shoe. A rotatable cutting drum is mounted within the body which is rotatably driven by an electric motor also mounted within the body. An aperture is formed through the shoe through which part of the periphery of the cutting drum extends. Cutting blades are mounted on the drum which, as the drum rotates, periodically pass through the aperture and below the shoe. In use, the shoe is located on a work piece and the drum is rotatably driven by the motor. When the blades pass through the aperture and move below the shoe, the blades engage with the workpiece and remove a thin slice of the workpiece from the surface of the workpiece, producing shavings or chips. Due to the rotational movement of the drum, the shavings or chips are thrown in a generally forward and upward direction in relation to the planer. One problem is the removal of the shavings or chips from the cutting area of the planer. A second problem is the collection of the shavings or chips for disposal.

In some designs of planer, the chips or shaving are directed using a deflector which directs the shavings or chips side ways from the planer. A fan or impeller mounted on the drive shaft of the motor can be used to generate an airflow which can be used to assist in the removal of the shavings or chips. DE19512262 discloses such a system. However, the problem with existing designs are that they are not efficient at mixing the air flow with the shavings or chips to entrain them for removal.

In order to collect the chips or shavings, a debris collection container is attached to the aperture through which the chips or shavings are ejected from the body of the planer. Existing designs of debris collection containers comprise a metal wire frame which is covered by a cloth bag such as a canvas bag. A tubular connector is attached to the metal wire frame and cloth bag and which can be attached to the ejection aperture so that the

Figure 1 shows a side view of the plane with the deflector removed;

Figure 2 shows a side view of the planer with deflector inserted in the planer;

Figure 3 shows the design of deflector for use in the planer;

Figure 4 shows a design drawing of a lengthwise vertical cross section of the planer through the centre of the planer (excluding the motor and handle);

Figure 5 shows a design drawing of a lengthwise slice taken through the planer at the position indicated by dashed line Z in Figure 2 (excluding the handle);

Figure 6 shows a perspective view of the first embodiment of a debris collection container;

Figure 7 shows an exploded view of the debris collection container excluding the cloth bag and circular end piece;

Figure 8 shows a perspective view of the debris collection container with the cap detached from the receptacle;

Figure 9 shows a side view of the second embodiment of the debris collection container;

Figure 10 shows a side view of the debris collection container with the cap detached;

Figure 11 shows a sketch of the connection mechanism of the second embodiment of the debris collection container;

Figure 12 shows a sketch of a top view of the planer with a debris collection container attached;

Figure 13 shows a design drawing of a lengthwise vertical cross section of the second embodiment of the planer through the centre of the planer (excluding the motor and handle);

Figure 14 shows a design drawing of a lengthwise slice taken through the second embodiment of the planer(excluding the handle);

Figure 15 shows a second downward side view of the planer with the deflector inserted; and

Figure 16 shows a design drawing of a lengthwise slice taken through the third embodiment of the planer(excluding the handle).

shaped curved trough have been flattened as best seen in figures 4 and 5. This results in a ridge 34 along the length of the curved section 30 where the flat surface 32 meets with a curved surface 36 of the U shaped cross-section. The shape of the cross-section of the curved section 30 of the deflector 26 is such that it fits snugly into the aperture 24 in the side wall of the body 2 of the planer in order to hold the deflector securely and prevent it from rotating within the aperture 24. Formed between the two sections 28, 30 is an annular rib 38 which surrounds the circumference of the deflector 26. The outer diameter of the annular rib 38 is greater than the diameter of the aperture 24 and thus prevents the deflector 26 from being inserted too far into the planer. When the deflector 24 is located within the body 2 of the planer, the rib 38 abuts against a side wall of the body 2 of a planer, the tubular section 28 remaining outside of the body. The rib is angled 35 in relation to the longitudinal axis 33 of the tubular section 28 so that it is less than ninety degrees as shown in Figure 3. This is to allow the tubular section to point upwards when located within the body of the planer. The deflector 26 is formed as a one-piece construction and is made from plastic moulded into the appropriate shape.

Mounted on the drive spindles of the motor is of fan (not shown) which generates an airflow. The air is directed into a cavity 40 formed in the body of the planer. The air then passes through a conduit 42 over the top wall 44 which forms the top wall of the aperture 24. The direction of the airflow is indicated by Arrows W. The airflow is then directed downwardly to an area 46 in the body 2 forward of the wall 48 of the recess 50 in which the drum 6 is mounted. An expulsion aperture 52 is formed in the wall 48 of the recess 52 forward of the cutting drum 6 through which any debris created by the cutting action of the blades 16 would be thrown by the rotating blades 16. The airflow is directed within the body to a point below the expulsion aperture 52 in the wall of the recess and is directed to be blown across the aperture 52 within the body in a direction having an acute angle to the direction of travel of any debris (shown by Arrow T) in order to entrain the debris in the airflow within the body.

The airflow and entrained debris is directed upwardly until it engages with the underside of the curved section 30 of the deflector 26 which is located within the aperture 24 when

debris created by the cutting action of the blades 16 would be thrown by the rotating blades 16. It will be appreciated that the vent 56 can be located slightly lower down relative to the adjacent the aperture 52.

Figures 6 to 8 show the first design of debris collection container which can be used with any of the three embodiments of planer previously described. The debris collection container comprises two sections, an end cap section 60 and the receptacle 70. The end cap section 60 is manufactured in a one-piece construction from transparent plastic. The end cap section 60 comprises a tubular connection section 62 which connects to the first tubular section 28 of the deflector 26. The tubular connection section 62 has a circular aperture (not shown) at one end whilst the other end meets with a dome shaped section or part spherical section 64. The dome shaped section 64 comprises a rim 66 which surrounds a large aperture formed in the base of the dome shape section 64. The rim 66 comprises an L-shaped slot 68 which forms part of a bayonet connection system for use in connecting the end cap section 60 to the receptacle 70. Air and entrained debris pass through the aperture in the end of the tubular connection section 62, through the tubular connection section 62 and into the dome shape section 64 before being expelled from the end cap section 60 through the large aperture in the base of the dome 64. The shape of the dome is such that it acts as a deflector, bending the air and entrained debris through ninety degrees so that the air and entrained debris are travelling perpendicular to the direction they were travelling in when they were passing through the tubular connection section 62. By constructing the dome shape section 64 in transparent plastic, the operator of the planer can look into the debris collection container to determine how full container is. Furthermore, as the planer is operating, the operator will be able to see the entrained debris passing through the tubular connection section 62 and pass through the dome section thereby enabling the operator to see that the planer is working correctly.

The receptacle 70 comprises a one end an annular plastic ring 72 which surrounds a large circular aperture which forms of the entrance to the receptacle 70. The annular plastic ring 72 is divided lengthwise into two halves, a front half 74 having a diameter less than that of the in the diameter of the rim 66 of the dome shaped section 64 of the end cap

two enabling flexibility within the receptacle. However, when the receptacle is not in use, the helical spring 84 can be compressed so that the circular end piece 82 is moved towards the annular plastic ring 72 until the U-shaped plastic loop 90 engages with the plastic catch 88 to secure the circular end piece 82 to the annular ring 72 maintaining the helical spring 84 under compression and substantially reducing the volume of the space within the receptacle. This is ideal for storage purposes.

In use, the tubular connection section of the end cap is connected to the deflector 26 on the planer. The receptacle 70 is connected to the end cap section by use of the bayonet connector. The circular end piece 82 is disconnected from the catch 88 on the annular plastic ring 72 to allow the helical spring 84 to bias the circular end piece 82 away from the plastic annular ring 72 generating the shape of the container.

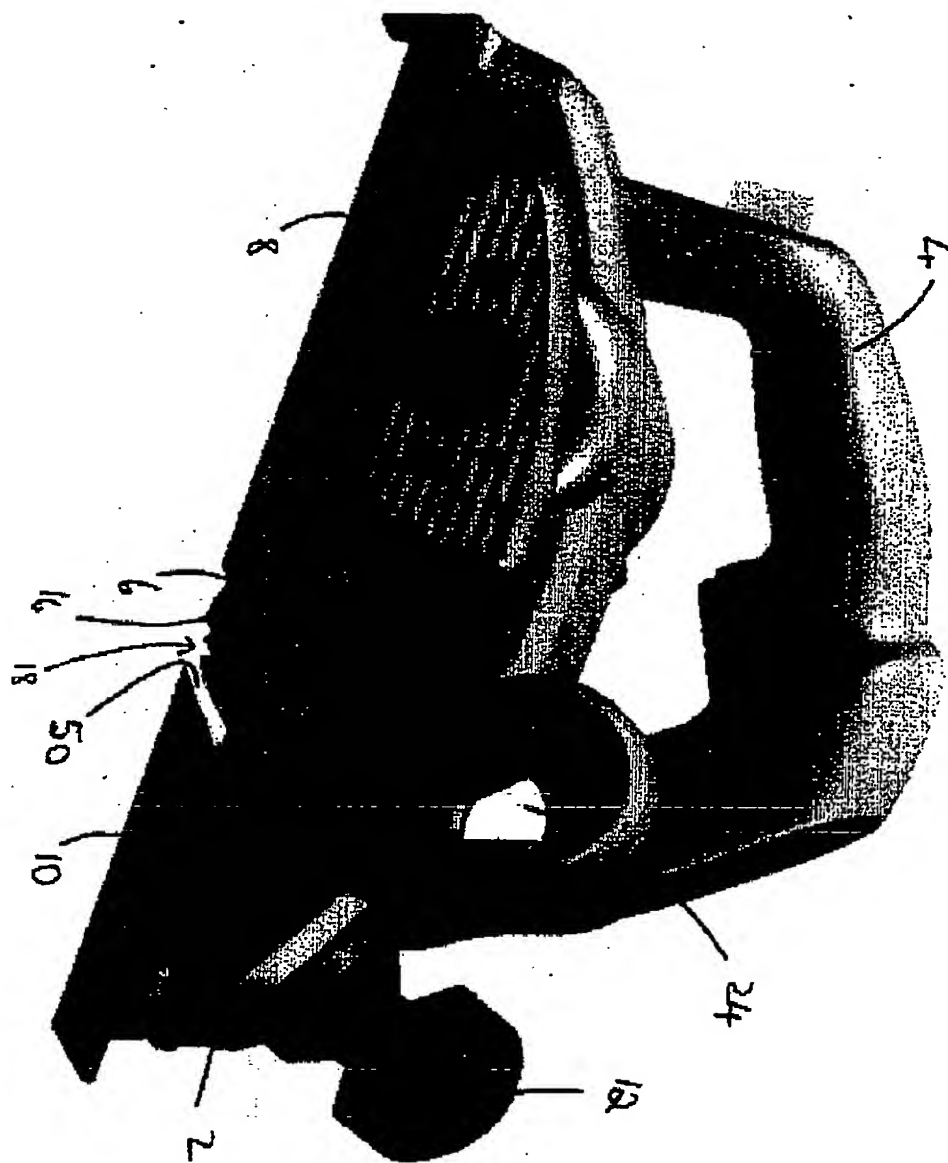
Referring to figures 9 to 11, a second design of debris collection container is shown. The debris collection container comprises an end cap 100 and a receptacle 102 which is capable of being attached to the end cap 100. The end cap 100 is manufactured in a one-piece construction from transparent plastic. The end cap 100 comprises a tubular connection section 104 which connects to the first outer section 28 of the deflector 26. The tubular connection section 104 has a circular aperture at one end whilst the other end meets with a dome shaped or semi-spherical section 106. The dome shape section 106 is mounted on a rectangular base 108 which comprises a rectangular rim 110 which surrounds a large aperture formed in the base of the dome shape section 106. The rim 110 comprises a T-shaped slot 112 which forms part of a connection system for use in connecting the end cap 100 to the receptacle 102. Air and entrained debris pass through the aperture in the end of the tubular connection section 104, through the tubular connection section and into the dome shape section 106 before being expelled from the end cap 100 through the large aperture in the base 108 of the dome. The shape of the dome 106 is such that it acts as a deflector for the air and entrained debris and causes it to bend through ninety degrees so that the air and entrained debris are travelling perpendicular to the direction they were travelling in when they were passing through the tubular connection section 104. By constructing the end cap 100 in transparent plastic,



The operator can then the push the end cap 100 towards the receptacle 102, the pegs 122 moving further into the T-shaped slot 112 until they become aligned with the top section of the T-shaped slot 112. The operator then releases the C shaped locking members 118 to allow them to move outwardly due to the biasing force of the springs 124 causing the pegs 122 to travel outwardly in the top section of the T-shaped slot 112 thus locking the receptacle 102 to the end cap 100.

Figure 12 shows they view of the second embodiment of the debris collection container attached to the planer. As can be seen, the debris collection container is located along side the planer and the longitudinal axis 132 of the debris container extends in parallel to the longitudinal axis 130 of the planer.

Fig. 1



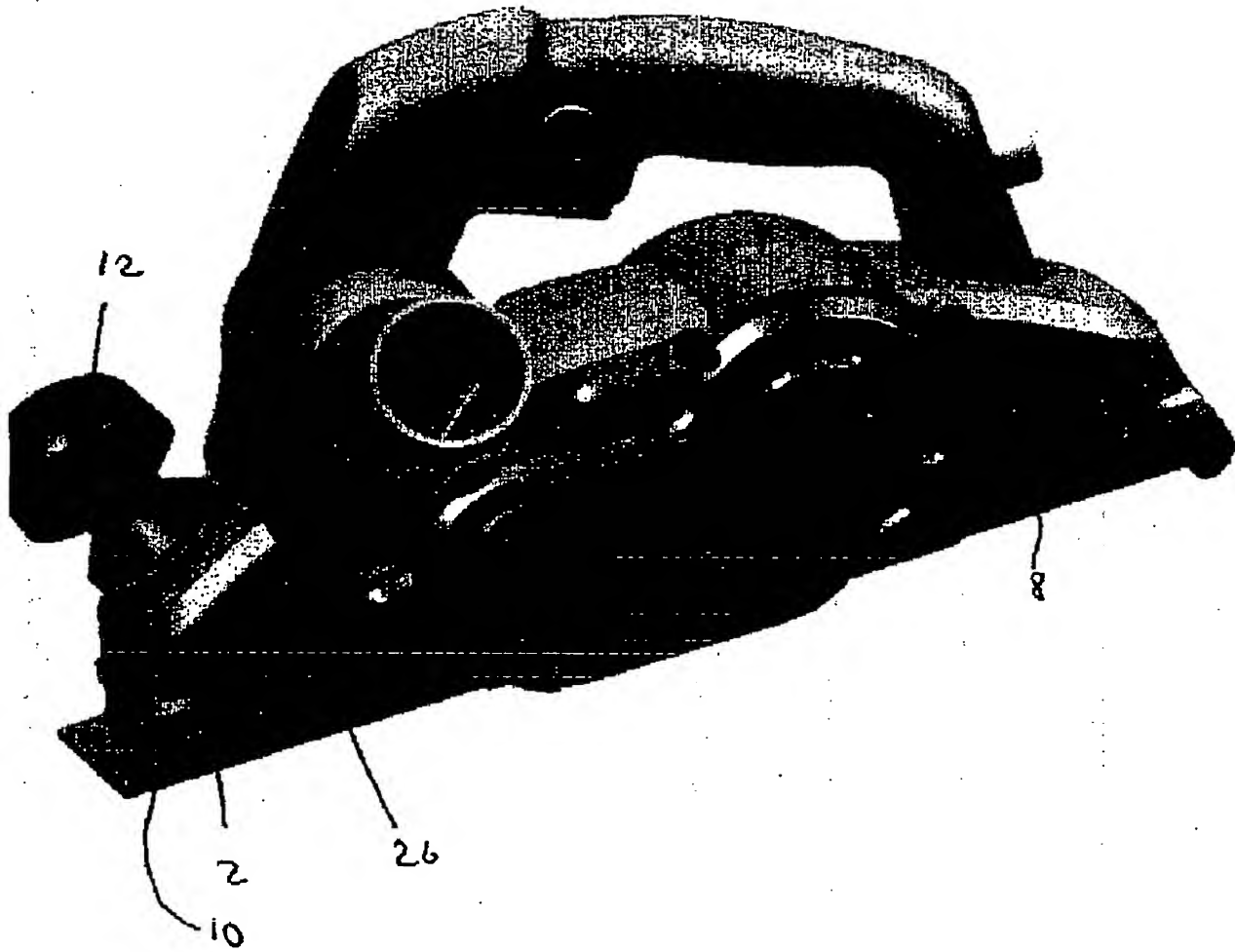


Fig. 2

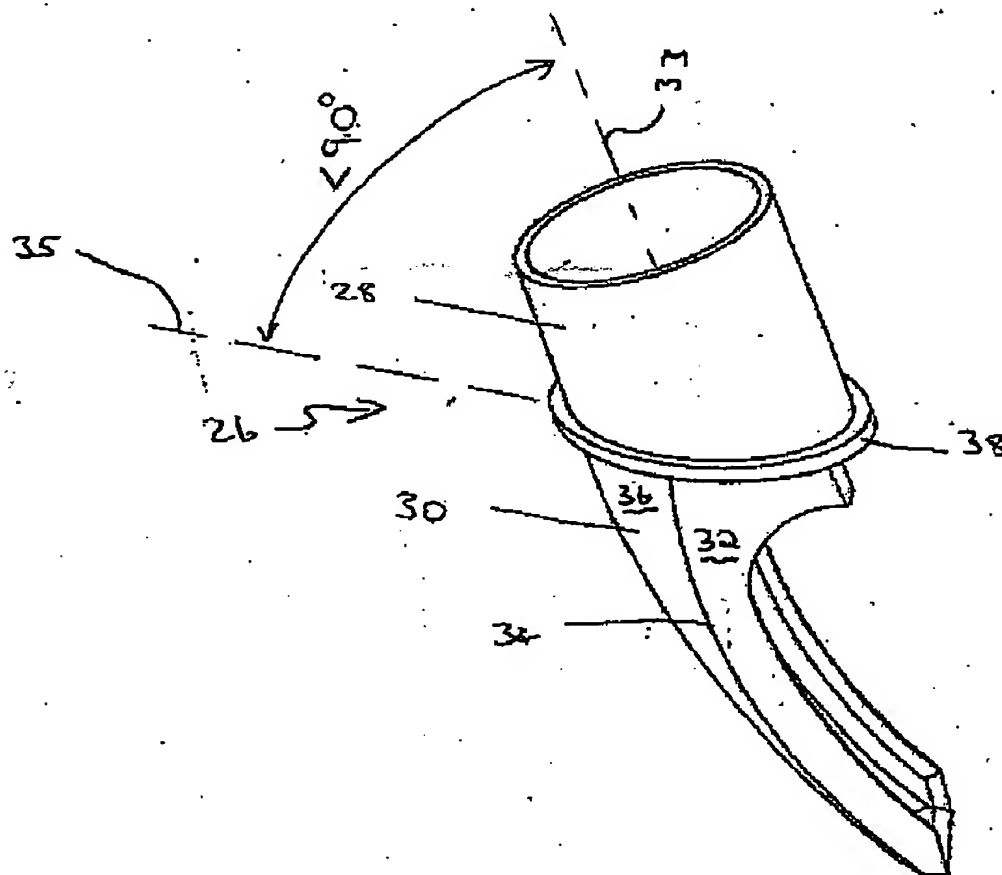
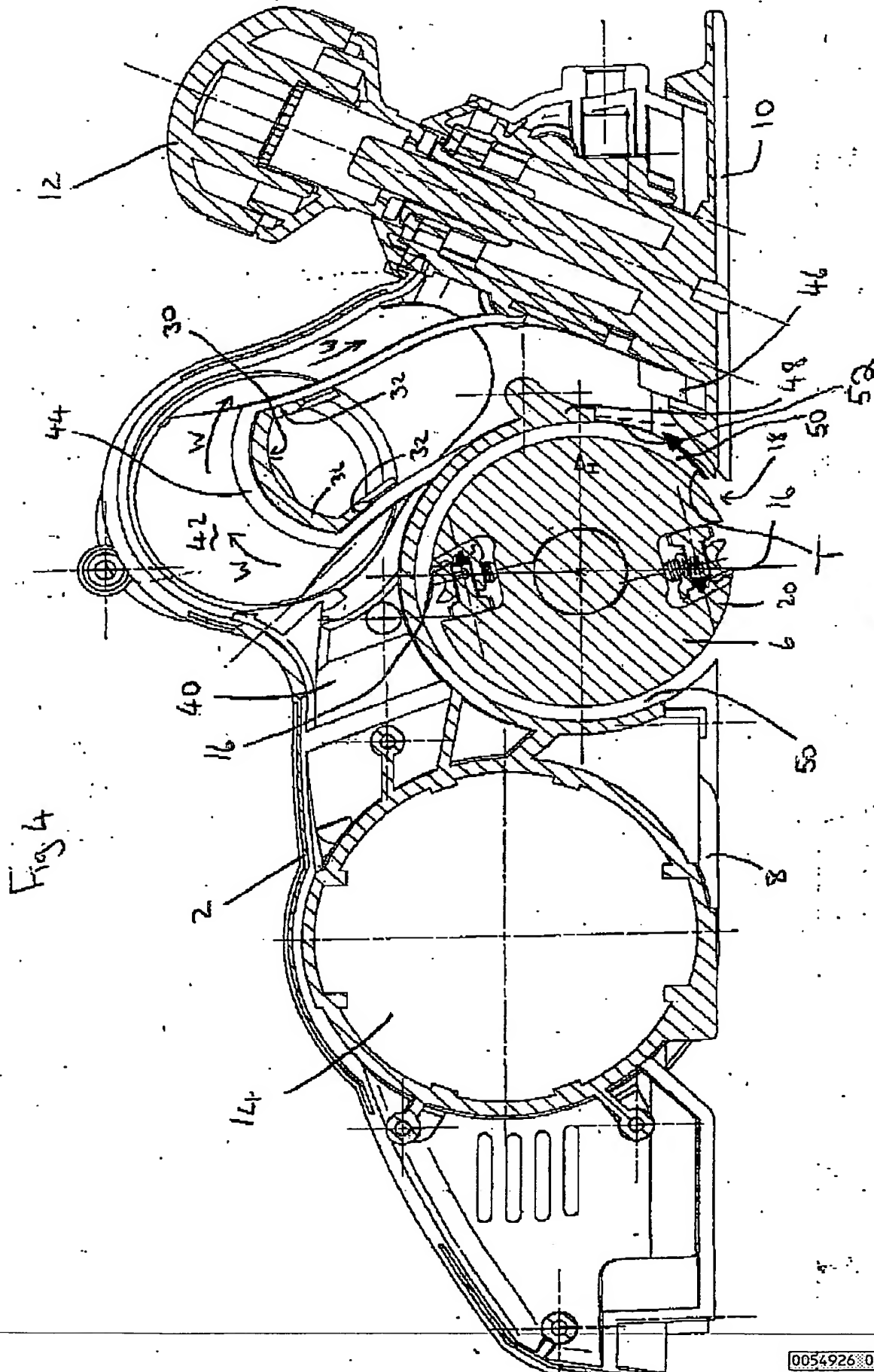


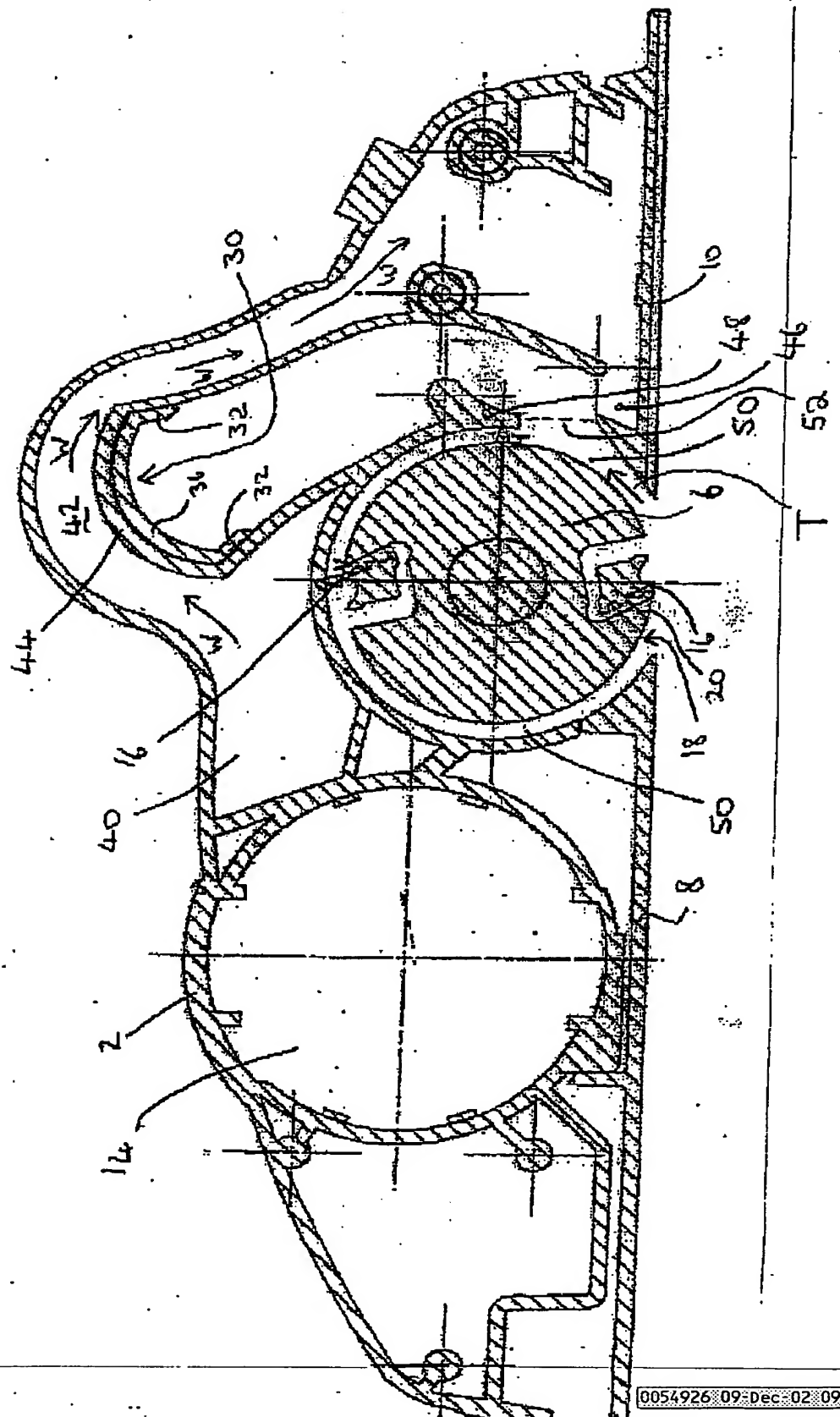
Figure 3



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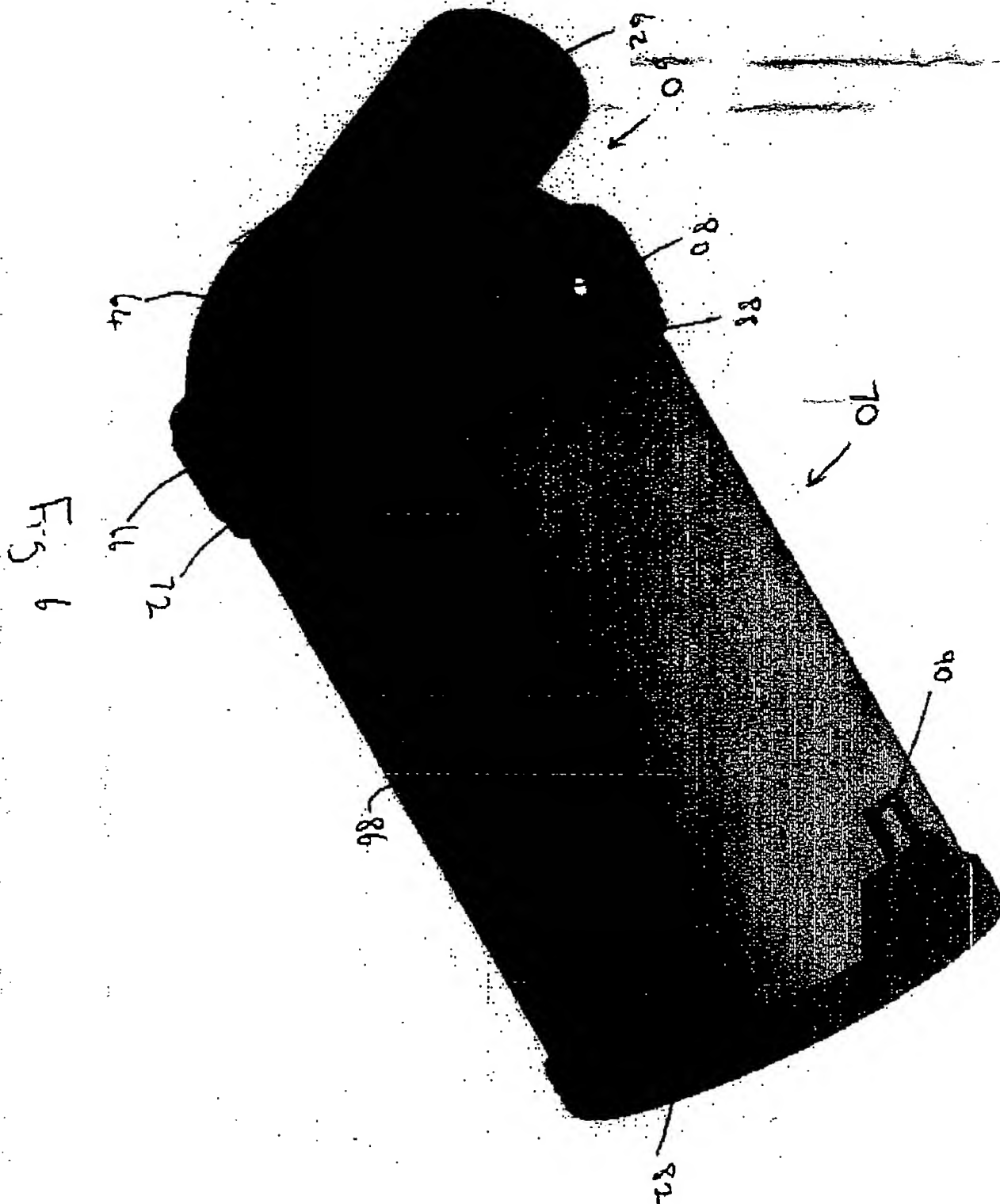


FIG 6

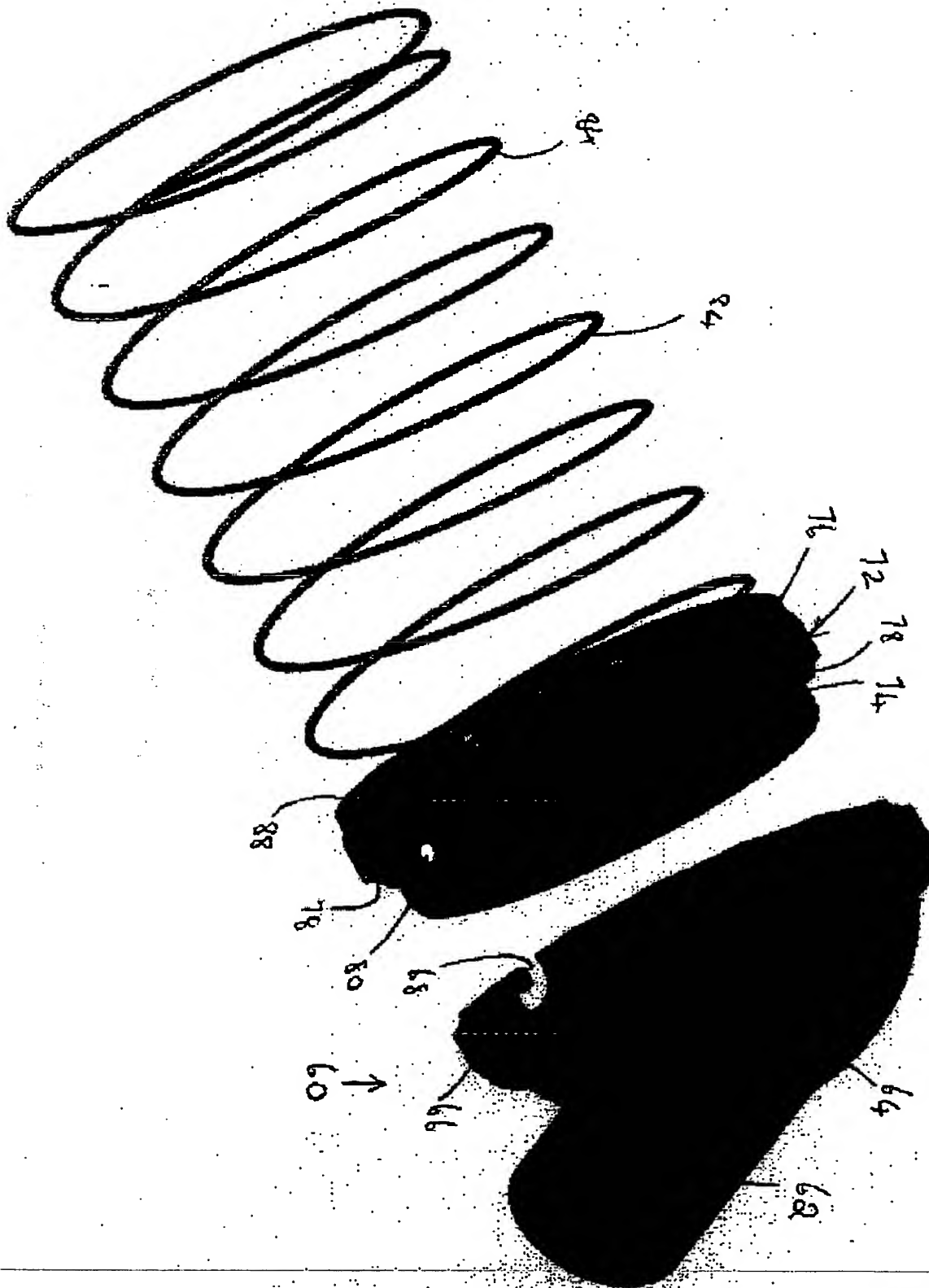


Fig. 7



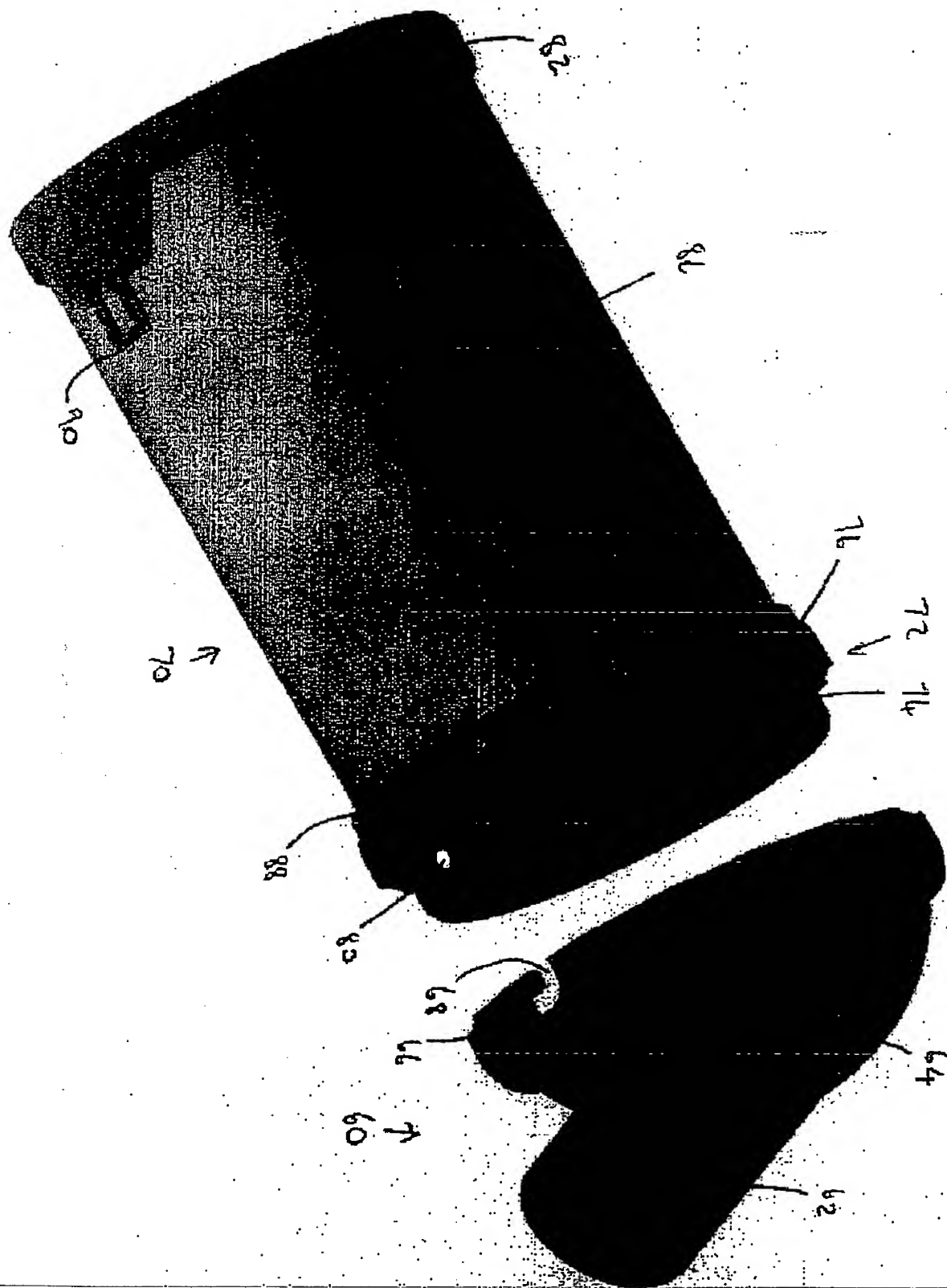


Fig 9

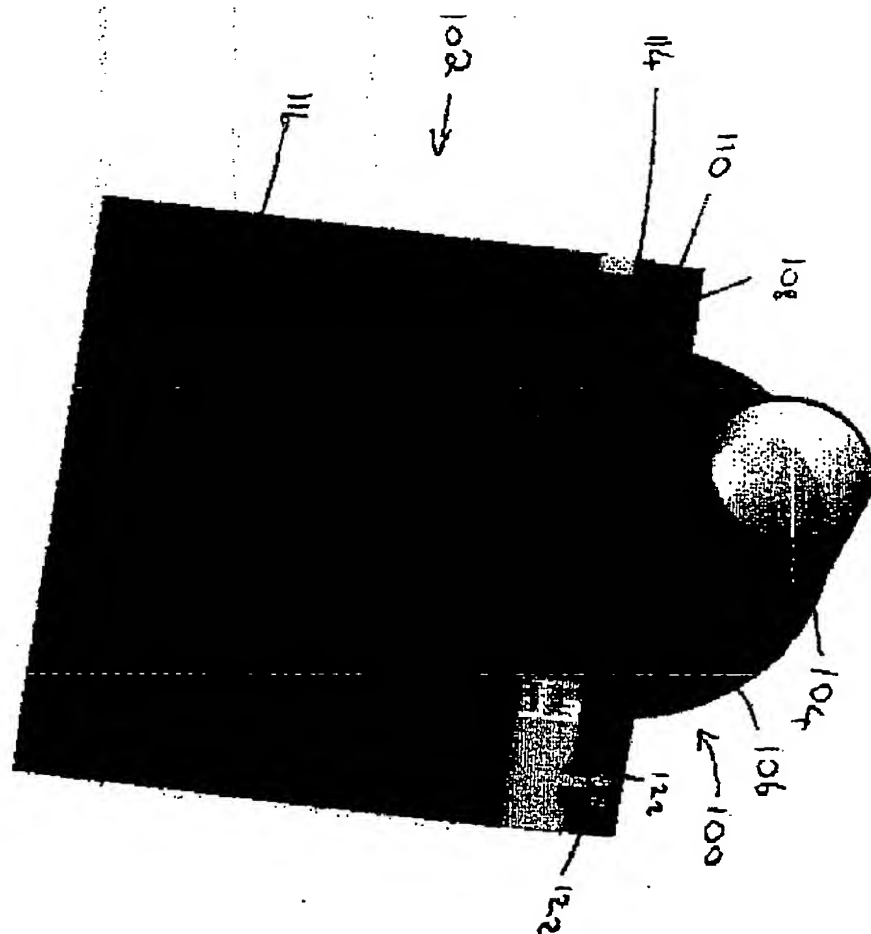


Fig. 10

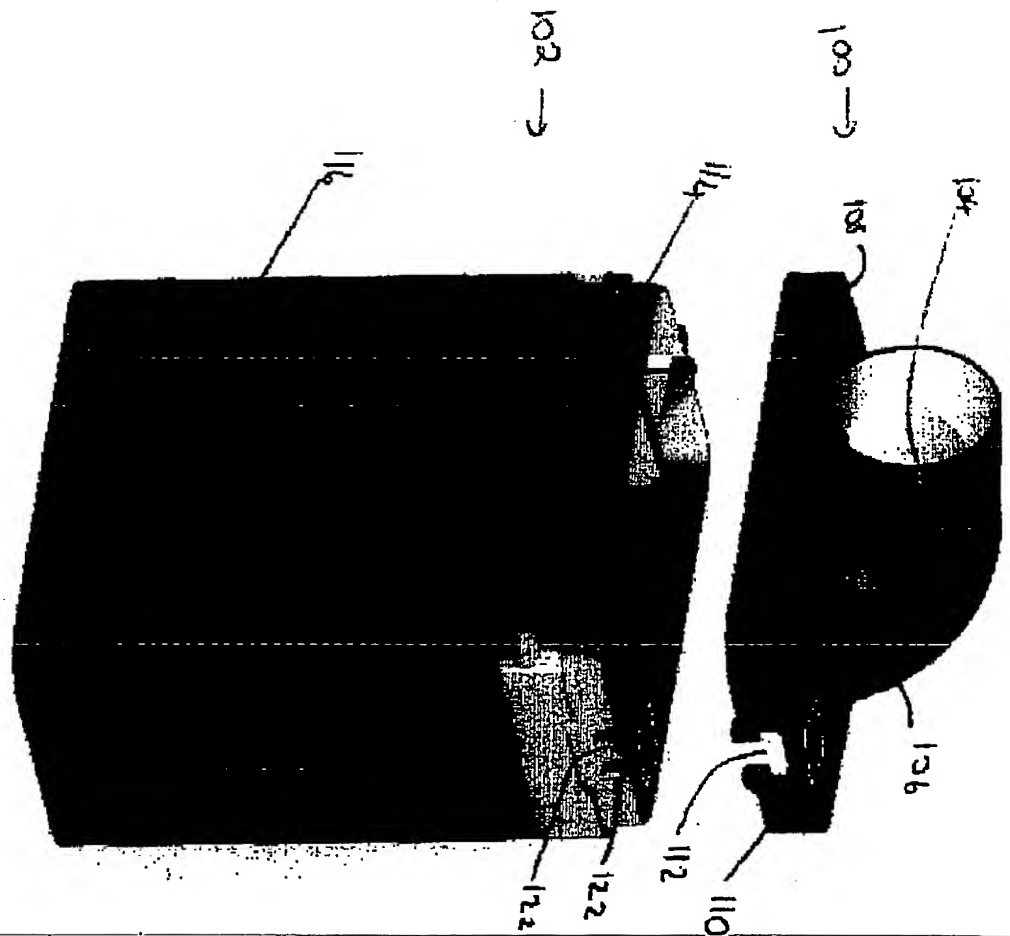
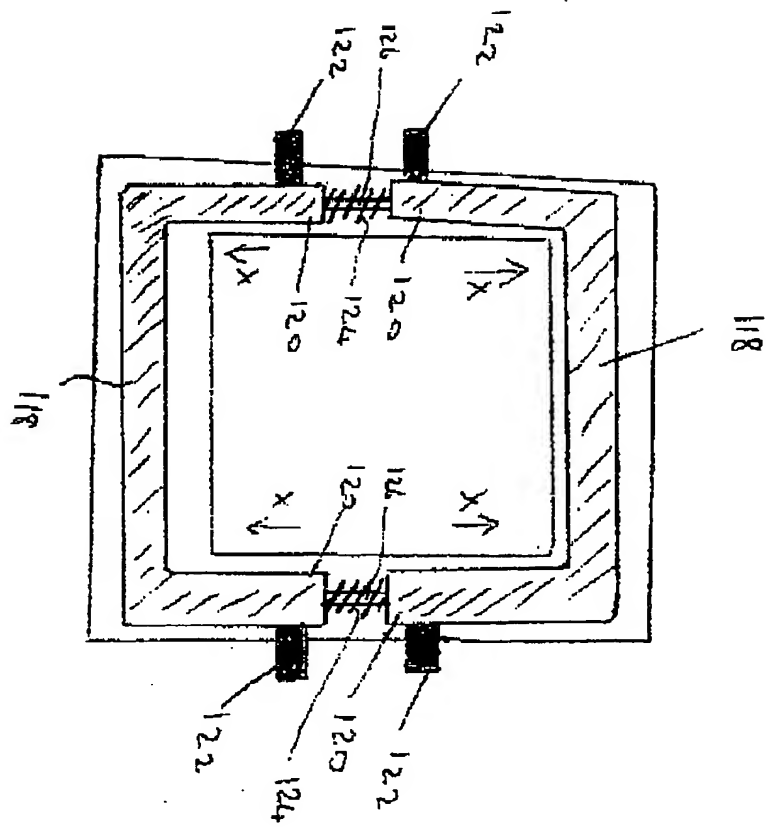
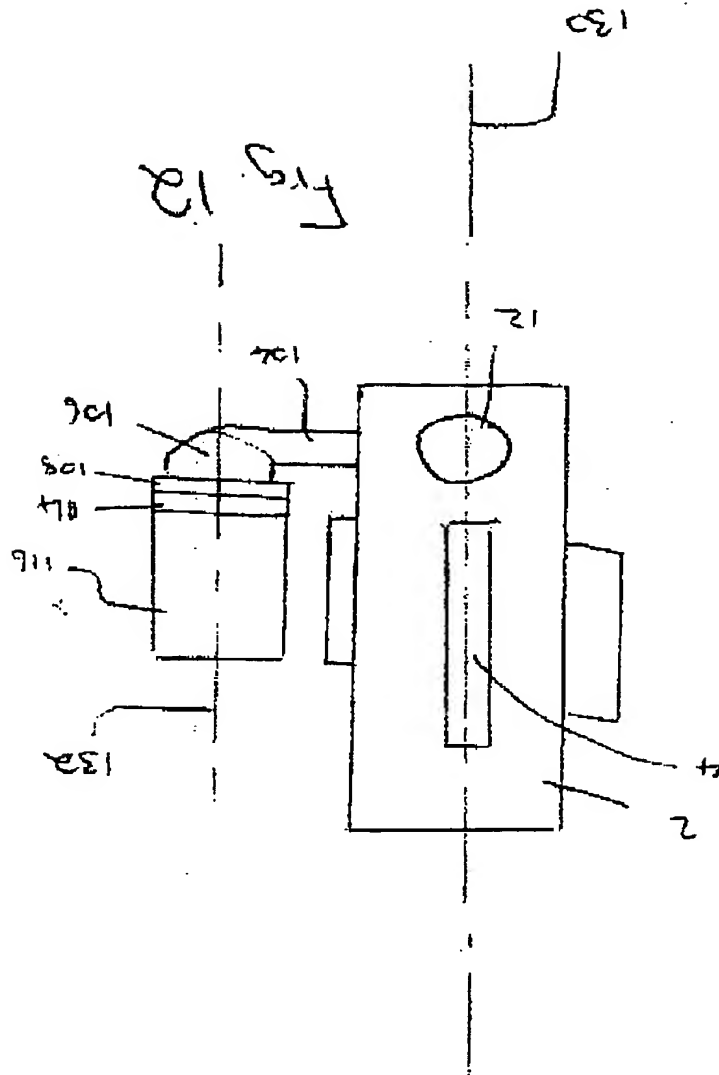
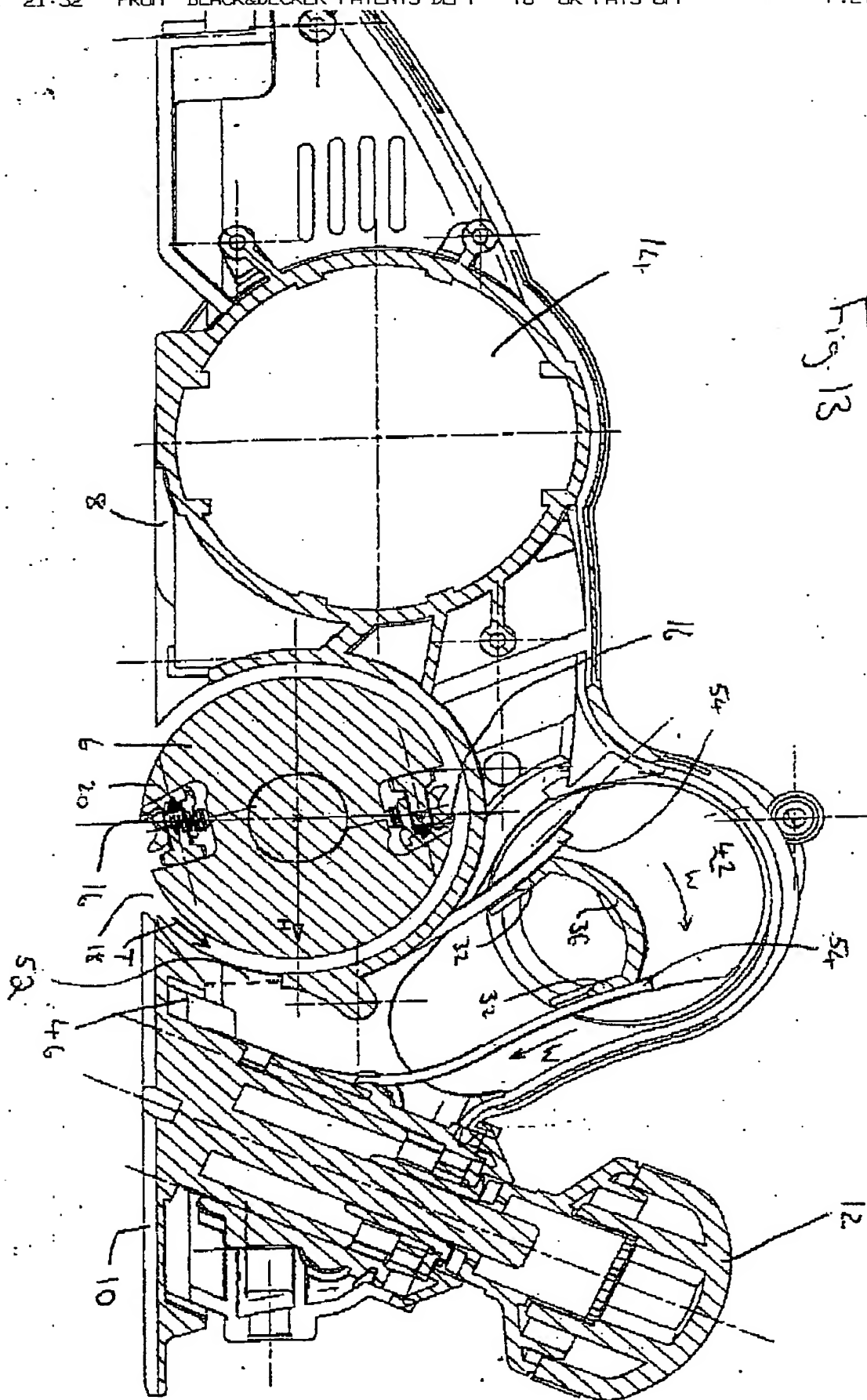
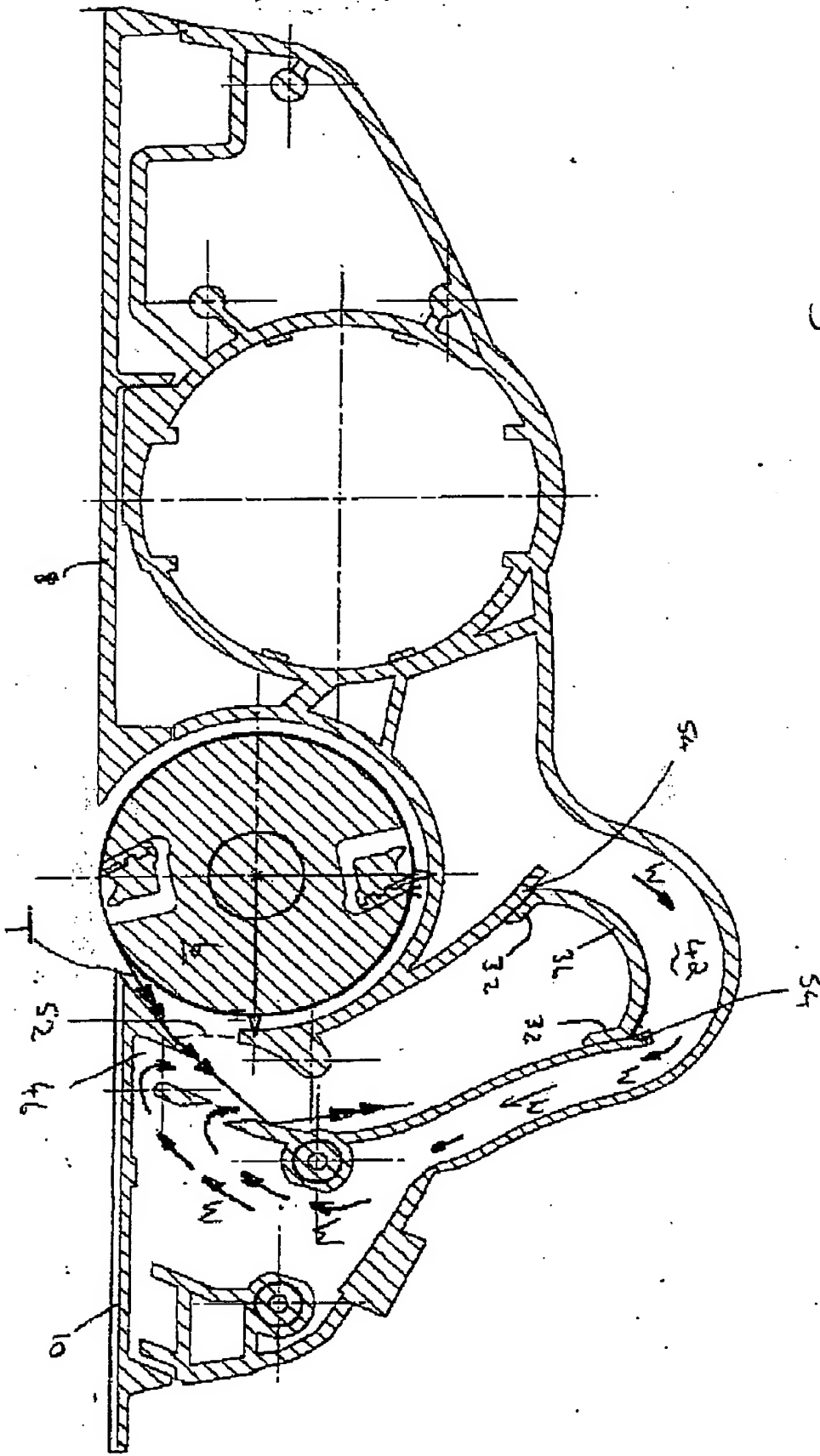


Fig 11









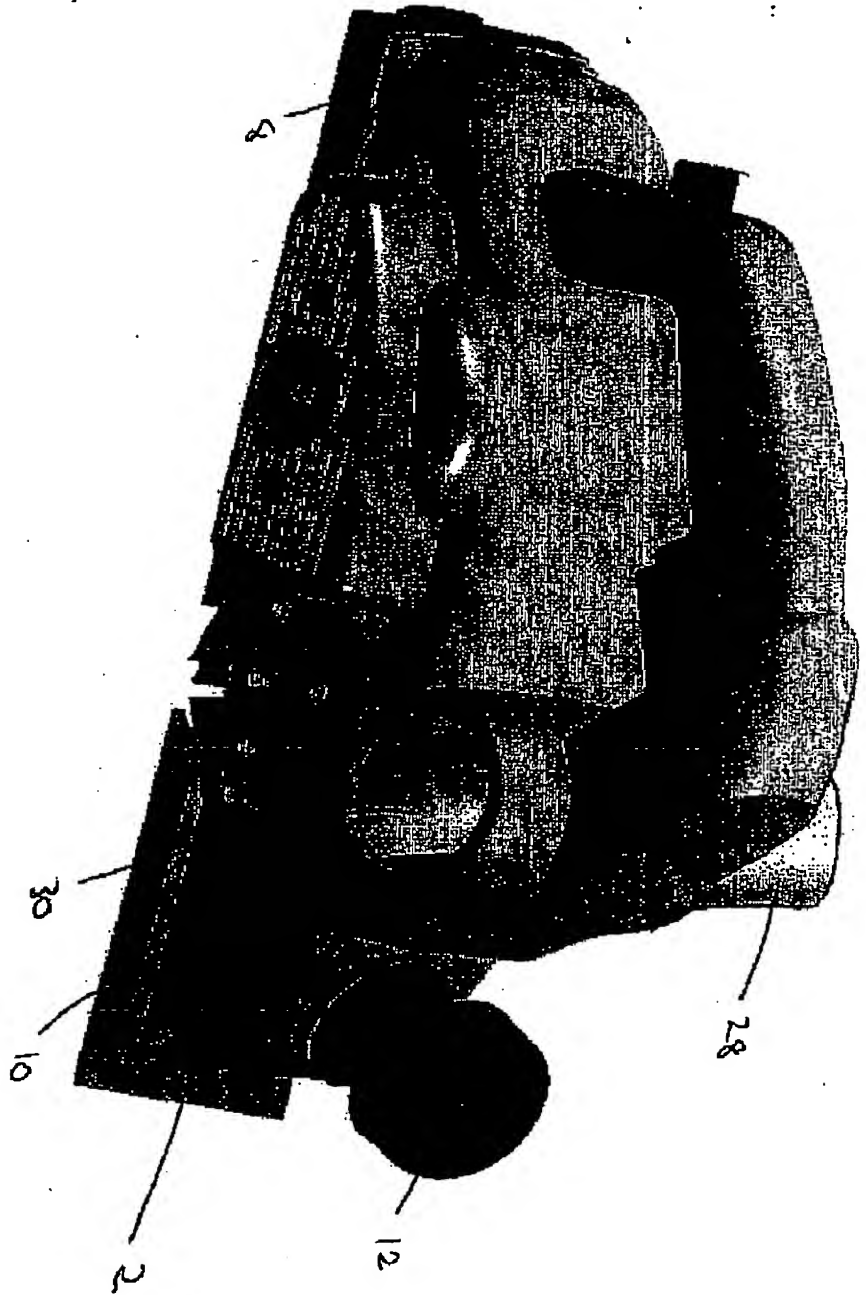


Fig. 15



